RISK ASSESSMENT OF HOUSEHOLD DETERGENTS IN SURFACE WATERS: PRINCIPLES, A CASE STUDY AND FUTURE STATE-OF-THE-ART DEVELOPMENTS.

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Detergents are manufactured in large quantities, used by many people, and disposed after household use into the environment. The detergent industry has long been committed to protecting consumers and the environment by establishing, publishing and implementing environmental policies insuring product safety.

This presentation will describe the principles and experimental approaches used to ensure that domestic detergent products have no adverse effects on aquatic and terrestrial life when discharged after use. The vast majority of this waste stream is treated via domestic wastewater treatment plants (WWTPs) as documented in the sewage treatment Directive 91/275/EEC. Waste water treatment plants reduce significantly the load of chemical substances to the receiving surface waters, and have become an intrinsic part of exposure and risk assessment of detergent chemicals (Figure 1).

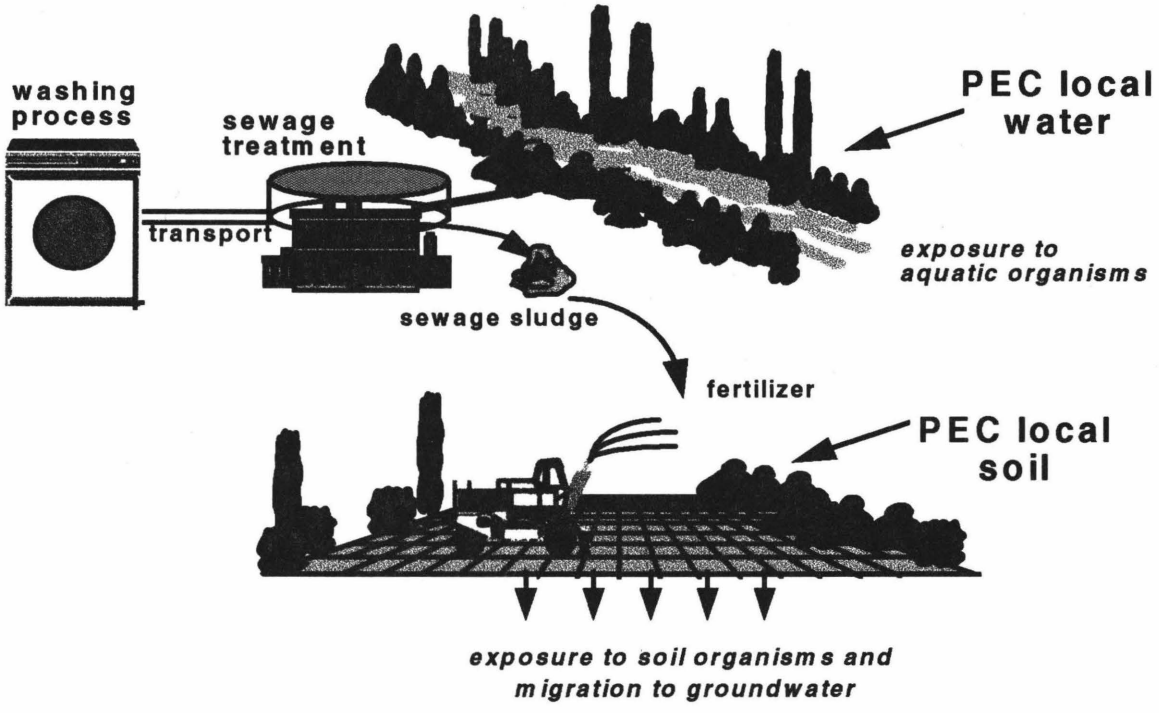

Figure 1: Fate and distribution of detergents in the environment

Environmental fate testing and distribution modeling includes therefore study or prediction of the removal (sorption, volatilization and biodegradation) of ingredients in sewage treatment and what happens to materials which pass through the sewage works and/or are associated to the sludge used in land applications. Effect testing

investigates the potential toxicity of the ingredients to aquatic and soil organisms and establishes their no effect concentrations. The fate and effects information is then used to assess whether the detergent ingredients can be used safely.

A case study, run jointly by the Dutch Detergent Industry (NVZ) and the Dutch authorities (VROM/RIZA/RIVM) will be summarized, which confirmed the removal in-situ, in several sewage treatment plants, of the most important surfactants used in household detergent market. This work was largely sponsored by ERASM, the Environmental Risk Assessment Steering Committee of the Association Internationale de la Savonnerie et la Détergence, et des Produits d'Entretiens (AISE) and the Comité Européen de Agents de Surface et Intermédiaires Organiques (CESIO), and focused on the major surfactants used in detergents - i.e. linear alkylbenzene sulfonate (LAS), alcohol ethoxylates (AE), alcohol ethoxylated sulfates (AES), and soap. An attempt will be made to extrapolate these risk assessment conclusions for the Netherlands to the rest of Europe using specific market and environmental data (Figure 2).

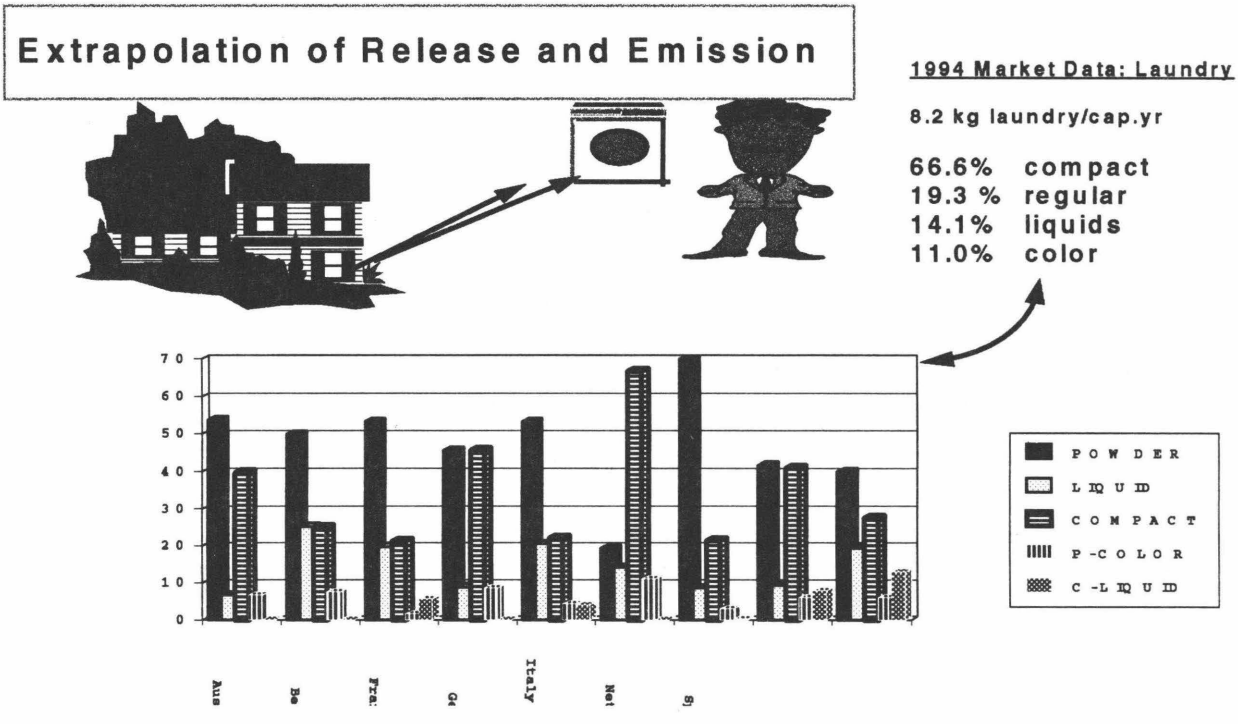

Figure 2: Market data for other European countries

The presentation will further provide insight on some state-of-the-art projects, sponsored by ERASM for a better understanding of river systems and how they are impacted by domestic sewage treatment and other diffuse inputs (Figure 3).

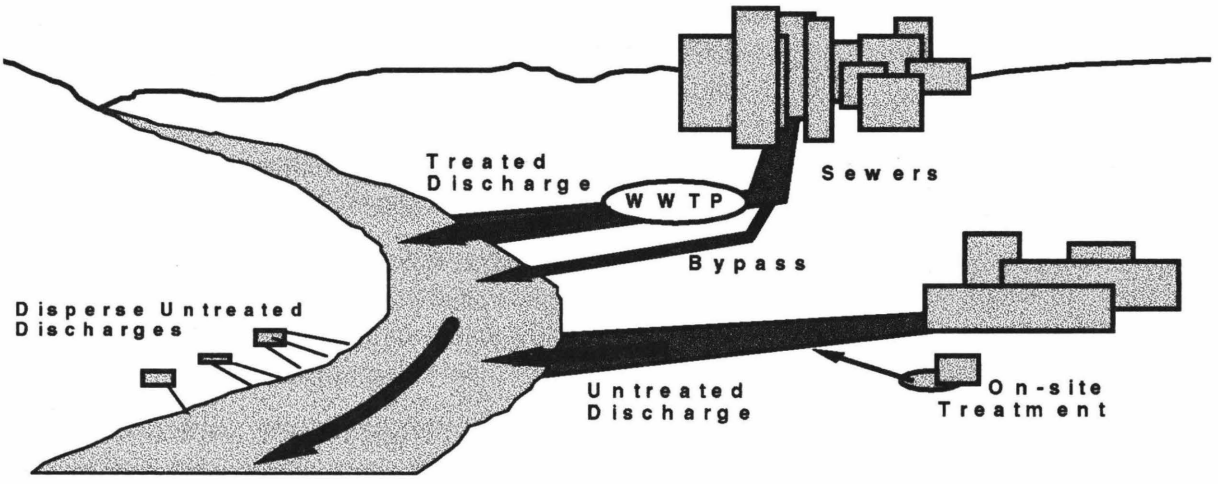

Figure 3: Schematic representation of input of household substances into river catchments

Such a new initiative includes the development of a geography-reference regional exposure assessment tool for European rivers (GREAT-ER) with the objective to develop and validate a powerful and accurate aquatic chemical exposure prediction tool for use within the EU environmental risk assessment schemes. A new database, model and software system will be developed to calculate the distribution of predicted environmental concentrations (PEC) - both in space and time - of down the drain chemicals in European surface waters on a river and catchment area level. This understanding will greatly improve the predictive use of mathematical models for calculating concentrations of discharged chemicals in river waters.